A Method and Device (RNC) for Controlling a Radio Cell Cluster Consisting of a Plurality of Radio Cells of a Multistandard Radio Network

Background of the invention:

The invention is based on a priority application DE 100 52 929.1 which is hereby incorporated by reference.

The present invention relates to a method of controlling a radio cell cluster consisting of a plurality of radio cells of a radio network. The radio network has different network components, namely at least one terminal, at least one base station, at least one device (radio network controller RNC) for controlling a radio cell cluster, and at least one switching device. The RNC is connected to the network components via interfaces. A plurality of protocol stacks, assigned to the different interfaces, are provided for processing protocols.

Summary of the invention:

The invention also relates to a device (radio network controller RNC) for controlling a radio cell cluster consisting of a plurality of radio cells of a radio network.

Radio networks with devices for controlling a radio cell cluster of the type described in the introduction are known from the prior art. A radio network can be divided into a plurality of network elements.

One network element of the radio network comprises subscriber terminals (so-called user equipment) having the form for example of mobile telephones. Another network element comprises base stations which are used for the supply of radio cells. The radio network is geographically divided into a multiplicity of radio cells. At least one base station is arranged in each radio cell. In a radio network operating in accordance with the UMTS standard, the base stations are referred to as node B. The base stations support the connection establishment to the terminals and establish the connections to a plurality of terminals in a radio cell. The connection has the form either of a permanent connection for the transmission of circuit switched data or a virtual connection for the transmission of packet switched data. The signals transmitted via the connection are digital voice or data signals.

Another network element comprises devices for controlling a radio cell cluster. In each instance one such device is assigned to a plurality of base stations. A device for controlling a radio cell cluster comprises approximately 200 to 1000 base stations. In the UMTS standard, a device of this kind is known as radio network controller (RNC). The device controls for example the radio resources (radio resource management) or the power resources (terrestrial resource management) of a radio cell cluster. In particular, a device of this kind must control a handover (transfer of a terminal from one radio cell into another) or, in the UMTS standard, the macro diversity mode (connection of a terminal to up to six base stations).

Another network element comprises at least one switching device (so-called core network, CN) superordinate to the RNC. A communications connection from one terminal to another or to a fixed network subscriber is established for example via such a CN.

A RNC is connected via interfaces to the other network components of the radio network. Thus a RNC comprises at least one Iu-interface to a CN, at least one

Iur-interface to another RNC, at least one Iub-NB-interface to a base station, and at least one logical Iub-UE-interface to a terminal UE which leads physically across the Iub-interface (referred to in the following as Iu-UE).

In a RNC a plurality of processors are provided for processing messages which arrive from or are sent to the other network components of the radio network. The messages consist of different sections, for example a header, a plurality of sections containing transport information, and a plurality of sections containing payload data. The payload data comprise one or more command(s) which is/are processed by the processors of the device. The protocols can be divided into different layers, a transport layer, a layer 1, a layer 2 and a layer 3. The layer 1 and the layer 2 are also referred to as radio processing. The layer 3 is referred to as service control. The messages reach the RNC via the interfaces and are forwarded to the processors by means of a switch element (switch). Via the switch the interfaces are connected to processor modules consisting of a plurality of individual processors.

A plurality of protocol stacks are provided in the RNC, these being assigned to the different interfaces of the RNC. Thus for example protocol stacks are provided which are assigned to the Iu-interface (interface to the CN), to the Iur-interface (interface to other RNCs), to the Iub-UE interface (logical, subscriber-dedicated interface to the UE with physical interface to the node B) or to the Iub-NB interface (interface to the NB substantially for common control and shared channels).

In a protocol stack assigned to the Iub-UE-interface, the following protocols are mainly processed: In the transport layer, the protocols, asynchronous transfer mode (ATM) and ATM adaptation layer type 2 (AAL2) for internal connections; in the layer 1, the protocols, frame protocol (FP) and diversity handover (DHO); in the layer 2 the protocols, medium access control (MAC) and radio resource control (RLC) and in the layer 3 the protocol radio resource control (RRC).